



## BSI Standards Publication

### Maritime works

Part 2: Code of practice for the design of quay walls, jetties  
and dolphins

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Published by BSI Standards Limited 2019

ISBN 978 0 580 98478 5

ICS 47.020.99; 93.140

The following BSI references relate to the work on this document:

Committee reference CB/502

Draft for comment 19/30360217 DC

**Amendments/corrigenda issued since publication**

Date

Text affected

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### Summary of pages

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# Foreword

## Publishing information

This part of BS 6349 is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 30 June 2019. It was prepared by Technical Committee CB/502, *Maritime works*. A list of organizations represented on this committee can be obtained on request to its secretary.

## Supersession

This part of BS 6349 supersedes [BS 6349-2:2010](#), which is withdrawn.

## Relationship with other publications

BS 6349 is published in the following parts:

- Part 1-1: *General – Code of practice for planning and design for operations*;
- Part 1-2: *General – Code of practice for assessment of actions*;
- Part 1-3: *General – Code of practice for geotechnical design*;
- Part 1-4: *General – Code of practice for materials*;
- Part 2: *Code of practice for the design of quay walls, jetties and dolphins*;
- Part 3: *Code of practice for the design of shipyards and sea locks*;
- Part 4: *Code of practice for design of fendering and mooring systems*;
- Part 5: *Code of practice for dredging and land reclamation*;
- Part 6: *Design of inshore moorings and floating structures*;
- Part 7: *Guide to the design and construction of breakwaters*;
- Part 8: *Code of practice for the design of Ro-Ro ramps, linkspans and walkways*.

## Information about this document

This is a full revision of the standard, and introduces the following principal changes:

- reorganization of the clauses to consolidate common recommendations in [Clause 4](#);
- rationalization arising from the publication of [BS 6349-1-2](#), which now deals with the assessment of actions;
- deletion of the clause that consisted solely of a reference to [BS 6349-8](#).

This publication can be withdrawn, revised, partially superseded or superseded. Information regarding the status of this publication can be found in the Standards Catalogue on the BSI website at [bsigroup.com/standards](http://bsigroup.com/standards), or by contacting the Customer Services team.

Where websites and webpages have been cited, they are provided for ease of reference and are correct at the time of publication. The location of a webpage or website, or its contents, cannot be guaranteed.

## Use of this document

As a code of practice, this part of BS 6349 takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

Any user claiming compliance with this part of BS 6349 is expected to be able to justify any course of action that deviates from its recommendations.

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

### **Presentational conventions**

The provisions in this standard are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is “should”.

*Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.*

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. “organization” rather than “organisation”).

### **Contractual and legal considerations**

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

**Compliance with a British Standard cannot confer immunity from legal obligations.**



## 1 Scope

This part of BS 6349 provides recommendations and guidance on the design of quay walls, jetties and dolphins.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes provisions of this document<sup>1</sup>. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

[BS 4211](#), *Specification for permanently fixed ladders*

BS 4592 (all parts), *Industrial type flooring and stair treads*

[BS 5395-1](#), *Stairs, ladders and walkways — Part 1: Code of practice for the design, construction and maintenance of straight stairs and winders*

[BS 6031](#), *Code of practice for earthworks*

[BS 6349-1-1](#), *Maritime works — Part 1-1: General — Code of practice for planning and design for operations*

[BS 6349-1-2](#), *Maritime works — Part 1-2: General — Code of practice for assessment of actions*

[BS 6349-1-3](#), *Maritime works — Part 1-3: General — Code of practice for geotechnical design*

[BS 6349-1-4](#), *Maritime works — Part 1-4: General — Code of practice for materials*

[BS 6349-4](#), *Maritime structures — Part 4: Code of practice for design of fendering and mooring systems*

[BS 6349-5](#), *Maritime structures — Part 5: Code of practice for dredging and land reclamation*

[BS 8002](#), *Code of practice for earth retaining structures*

[BS 8004](#), *Code of practice for foundations*

[BS 8300-1](#), *Design of an accessible and inclusive built environment — Part 1: External environment — Code of practice*

BS EN 1537, *Execution of special geotechnical work — Ground anchors*

BS EN 1538, *Execution of special geotechnical works — Diaphragm walls*

BS EN 1990, *Eurocode — Basis of structural design*

[BS EN 1991](#) (all parts), *Eurocode 1 — Actions on structures*<sup>2</sup>

[BS EN 1992](#) (all parts), *Eurocode 2 — Design of concrete structures*

[BS EN 1993](#) (all parts), *Eurocode 3 — Design of steel structures*<sup>2</sup>

[BS EN 1994](#) (all parts), *Eurocode 4 — Design of composite steel and concrete structures*

[BS EN 1995](#) (all parts), *Eurocode 5 — Design of timber structures*

[BS EN 1996](#) (all parts), *Eurocode 6 — Design of masonry structures*

[BS EN 1997](#) (all parts), *Eurocode 7 — Geotechnical design*<sup>2</sup>

[BS EN 1998](#) (all parts), *Eurocode 8 — Design of structures for earthquake resistance*<sup>2</sup>

<sup>1</sup> Documents that are referred to solely in an informative manner are listed in the Bibliography.

<sup>2</sup> This part of BS 6349 gives dated references to BS EN 1991-1-1:2002, BS EN 1991-2:2003, BS EN 1993-1-1:2005, BS EN 1997-1:2004, and BS EN 1998-2:2005+A2:2011. It also gives an informative reference to BS EN 1993-5:2007.

[BS EN 1999](#) (all parts), *Eurocode 9 — Design of aluminium structures*

[BS EN 10210](#) (all parts), *Hot finished structural hollow sections of non-alloy and fine grain steels*

[BS EN 10219](#) (both parts), *Cold formed welded structural hollow sections of non-alloy and fine grain steels*

BS EN 12063, *Execution of special geotechnical work — Sheet pile walls*

BS EN 12464-2, *Lighting of work places — Part 2: Outdoor work places*

[BS EN ISO 14122](#) (all parts), *Safety of machinery — Permanent means of access to machinery*

BS EN ISO 19902, *Petroleum and natural gas industries — Fixed steel offshore structures*

BS ISO 12488-1, *Cranes — Tolerances for wheels and travel and traversing tracks — Part 1: General*

NA to BS EN 1991-1-1:2002, *UK National Annex to Eurocode 1 — Actions on structures — Part 1-1: General actions — Densities, self-weight, imposed loads for buildings*

### 3 Terms, definitions and symbols

#### 3.1 Terms and definitions

For the purposes of this part of BS 6349, the terms and definitions given in [BS 6349-1-1](#), BS EN 1990 and the following apply.

##### 3.1.1 access trestle

bridge connecting a jetty head to the shore to provide vehicular or pedestrian access and/or support to pipes or conveyors

##### 3.1.2 apron

area of open land adjacent to a berth

##### 3.1.3 berthing beam

isolated piled structure with a continuous capping situated parallel to a berth and having a similar function to two or more berthing dolphins

##### 3.1.4 berthing line

line of the face of the fenders or (where no fenders exist) the berth structure, in the undeflected position

##### 3.1.5 combined wall

retaining wall composed of primary and secondary elements that act in combination

*NOTE Combined walls are commonly referred to as combi-walls.*

##### 3.1.6 cope

top edge of a quay or jetty adjacent to a berth

##### 3.1.7 cut thread

thread formed in a cylindrical bar using a cutting tool to remove material and form troughs

*NOTE The major thread diameter cannot therefore be greater than that of the parent bar.*

### **3.1.8 dolphins**

#### **3.1.8.1 dolphin**

isolated structure or strongpoint used either to manoeuvre a vessel or to facilitate holding it in position at its berth

#### **3.1.8.2 berthing dolphin**

dolphin designed to take the impact of a berthing vessel and to hold it when being pushed against a berth by wind or current

*NOTE A berthing dolphin usually incorporates means for securing vessel spring lines.*

#### **3.1.8.3 lead-in dolphin**

dolphin provided at the approach to a structure or change of direction of a berth, to guide a vessel to the desired berthing line or sea lock entrance or to protect a vulnerable structure

#### **3.1.8.4 mooring dolphin**

dolphin with bollards or hooks for securing a vessel and for preventing it from moving away from a berth due to wind or current action

*NOTE A mooring dolphin is usually set back from the berthing line so that it cannot be struck by a berthing vessel and to improve the effectiveness of mooring lines.*

### **3.1.9 embedded retaining wall**

retaining wall of thin cross-section that resists actions by bending

#### **3.1.10 false deck**

structural slab overlaid with fill and surfacing

#### **3.1.11 gravity wall**

retaining wall of heavy cross-section that resists horizontal actions by means of dead weight and friction

*NOTE The dead weight can be augmented by ground anchors.*

#### **3.1.12 hydraulic fill**

fill material which is transported to the reclamation area by pumping through pipelines and allowed to settle out under water

#### **3.1.13 jetty**

structure that extends into the water area from the shore and provides a berth or berths

*NOTE A jetty can be connected to the shore by an access trestle or causeway, or can be of the island type.*

#### **3.1.14 jetty head**

platform at the seaward end of a jetty or causeway

#### **3.1.15 marginal quay**

quay that backs on to the shore or reclaimed land

#### **3.1.16 quay**

structure used for loading and unloading ships